



# **Armed Forces College of Medicine AFCM**



## **Oral Cavity and Tongue**

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## INTENDED LEARNING OBJECTIVES (ILO)

**By the end of this lecture the student will be able to:**

- 1. Define the vestibule of the mouth and oral cavity proper.**
- 2. Recognize sensory innervation of the mouth.**
- 3. Identify different parts of the tongue: root, tip, dorsal surface and inferior surface.**
- 4. Describe the muscles of the tongue: intrinsic and extrinsic (origin, insertion, nerve supply and action).**

# Lecture Plan



- 1. Part 1 (5 min) Introduction**
- 2. Part 2 (40 min) Main lecture**
- 3. Part 3 (5 min) Summary**

## Key Points



- 1. Boundaries and divisions of the oral cavity**
- 2. Parts and surfaces of the tongue**
- 3. Muscles of the tongue**
- 4. Innervation and blood supply of the tongue**

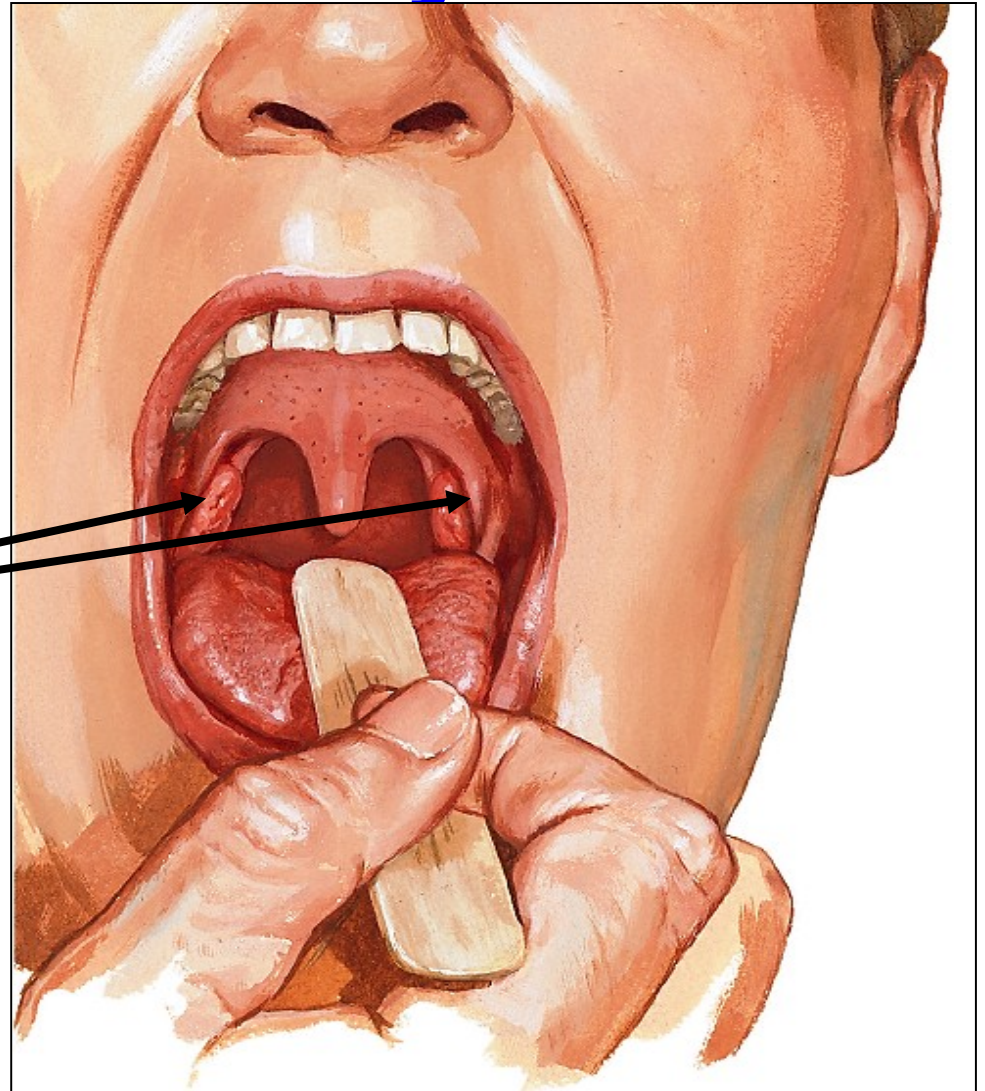
# Oral Cavity

## □ Boundaries:

- Anteriorly: lips.
- Laterally: cheeks.
- Posteriorly: palatoglossal arches.

## □ Divisions

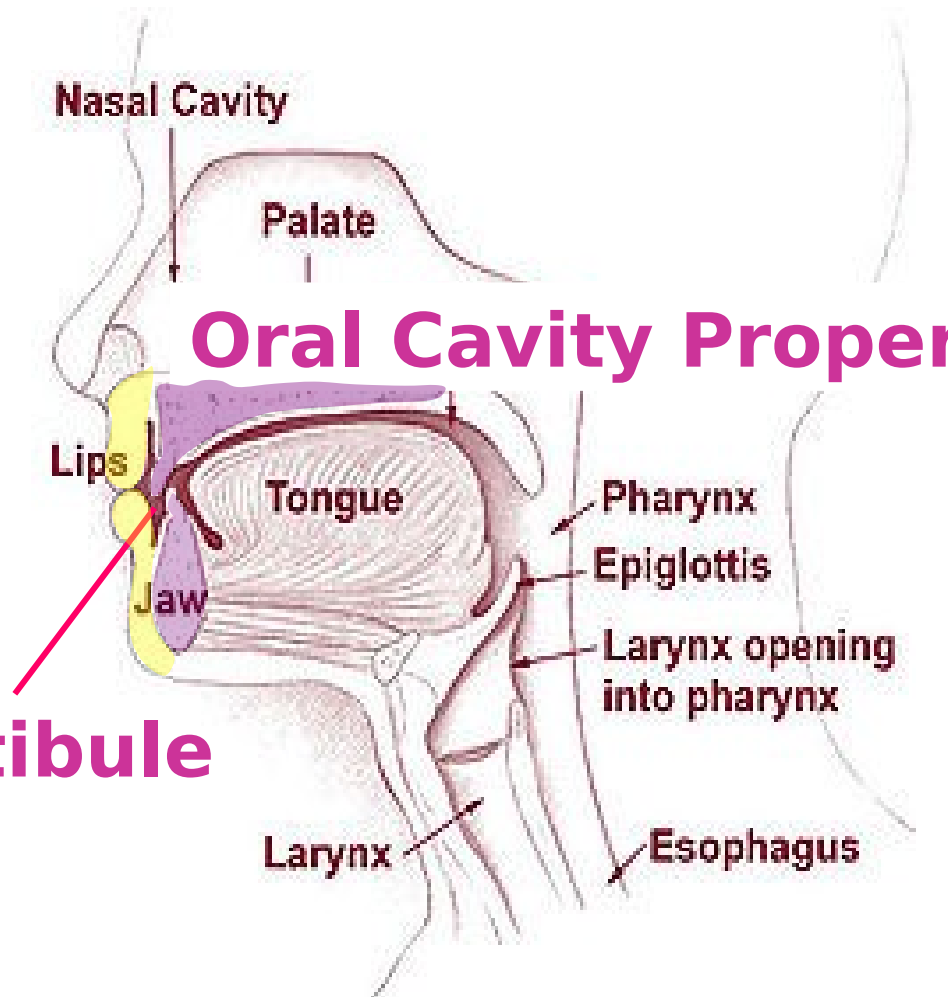
1. Vestibule
2. Oral cavity proper

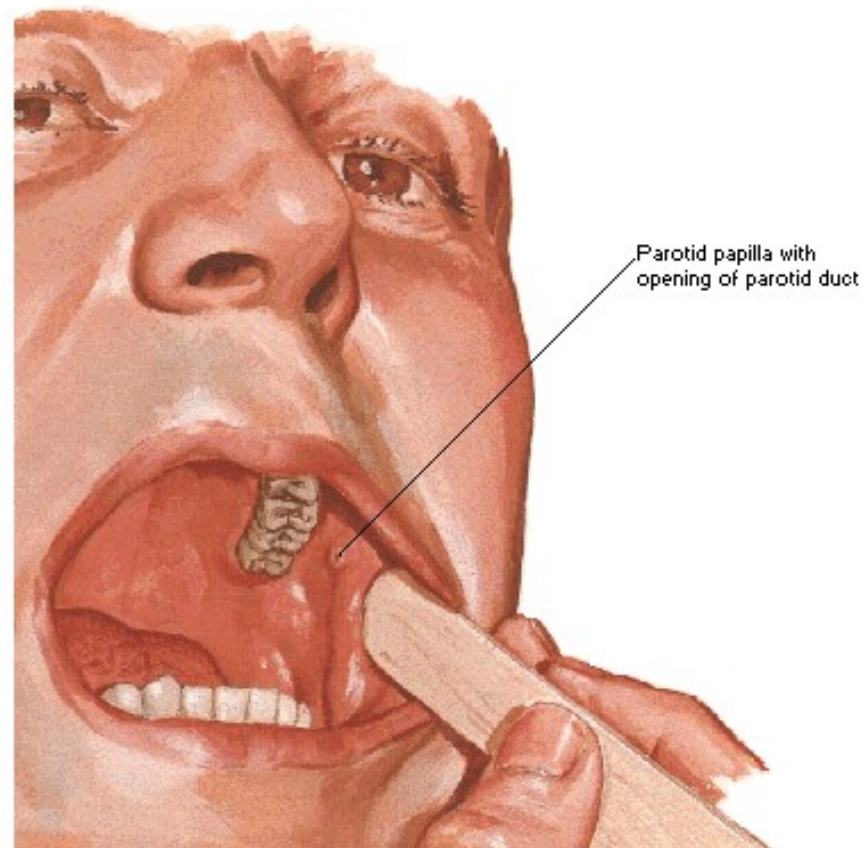
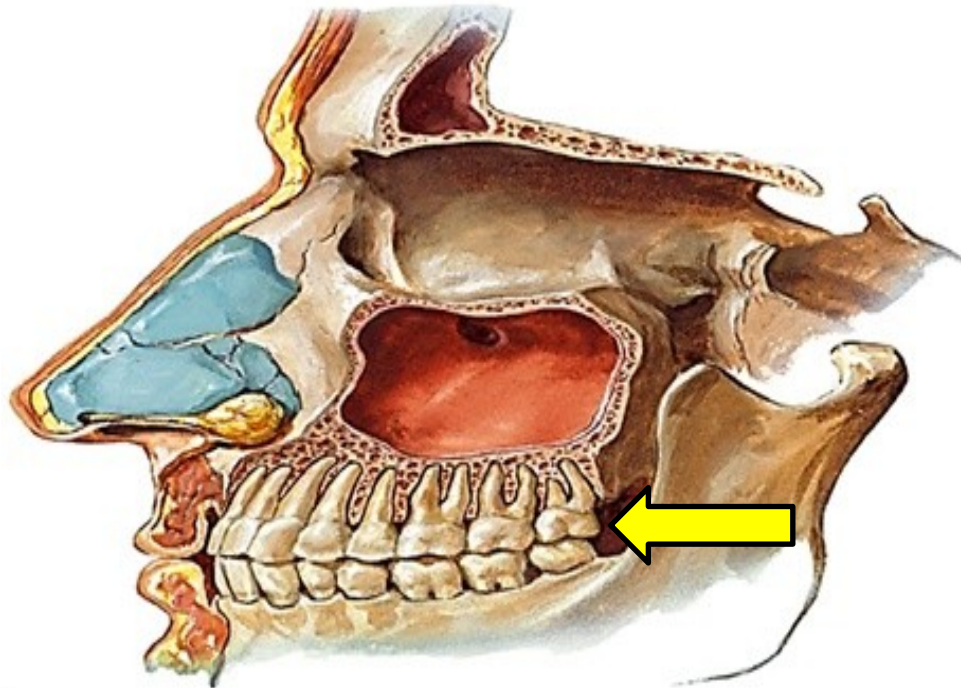


# Oral Cavity

## □ Vestibule:

- It is a **very narrow space** outside teeth and gums i.e. between teeth and lips or cheeks.
- When the teeth are **opposed**, it **communicates** with the oral cavity proper **behind** the **3<sup>rd</sup> molar**.
- The vestibule **contains** the opening of the parotid duct: lies opposite to the upper **2<sup>nd</sup> molar tooth**.

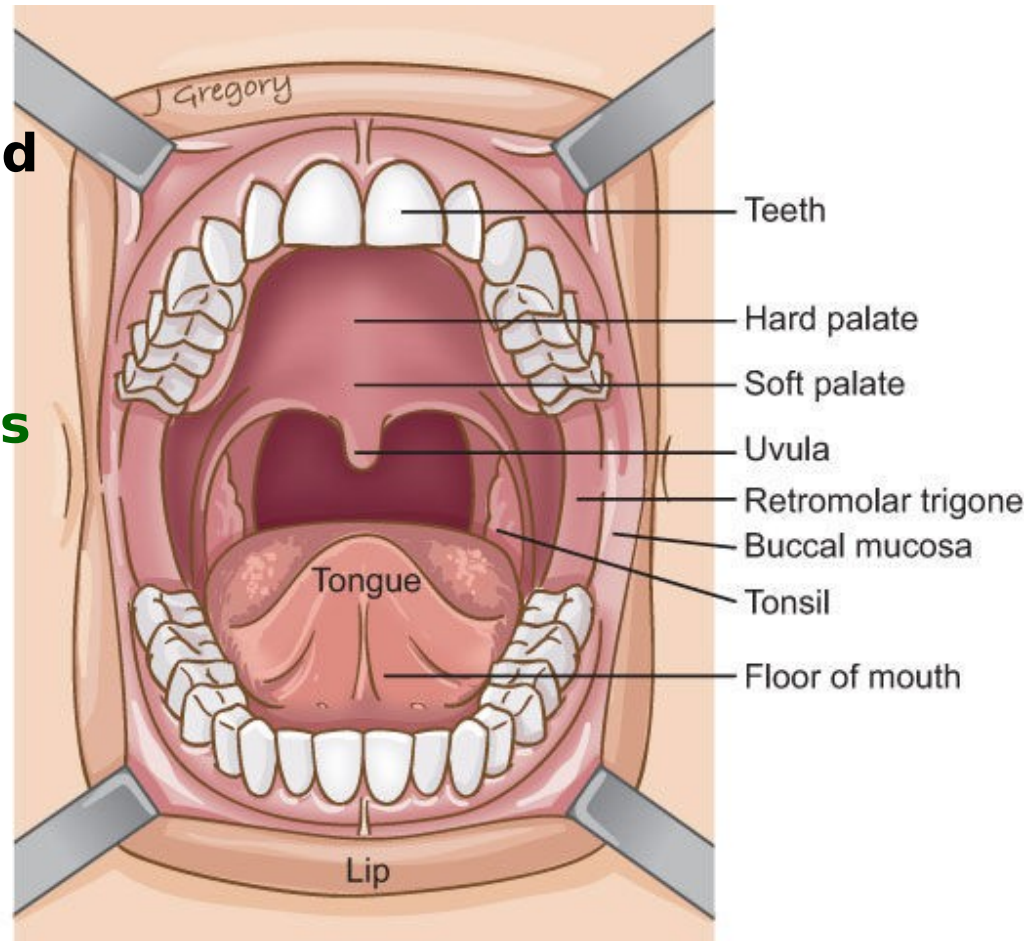


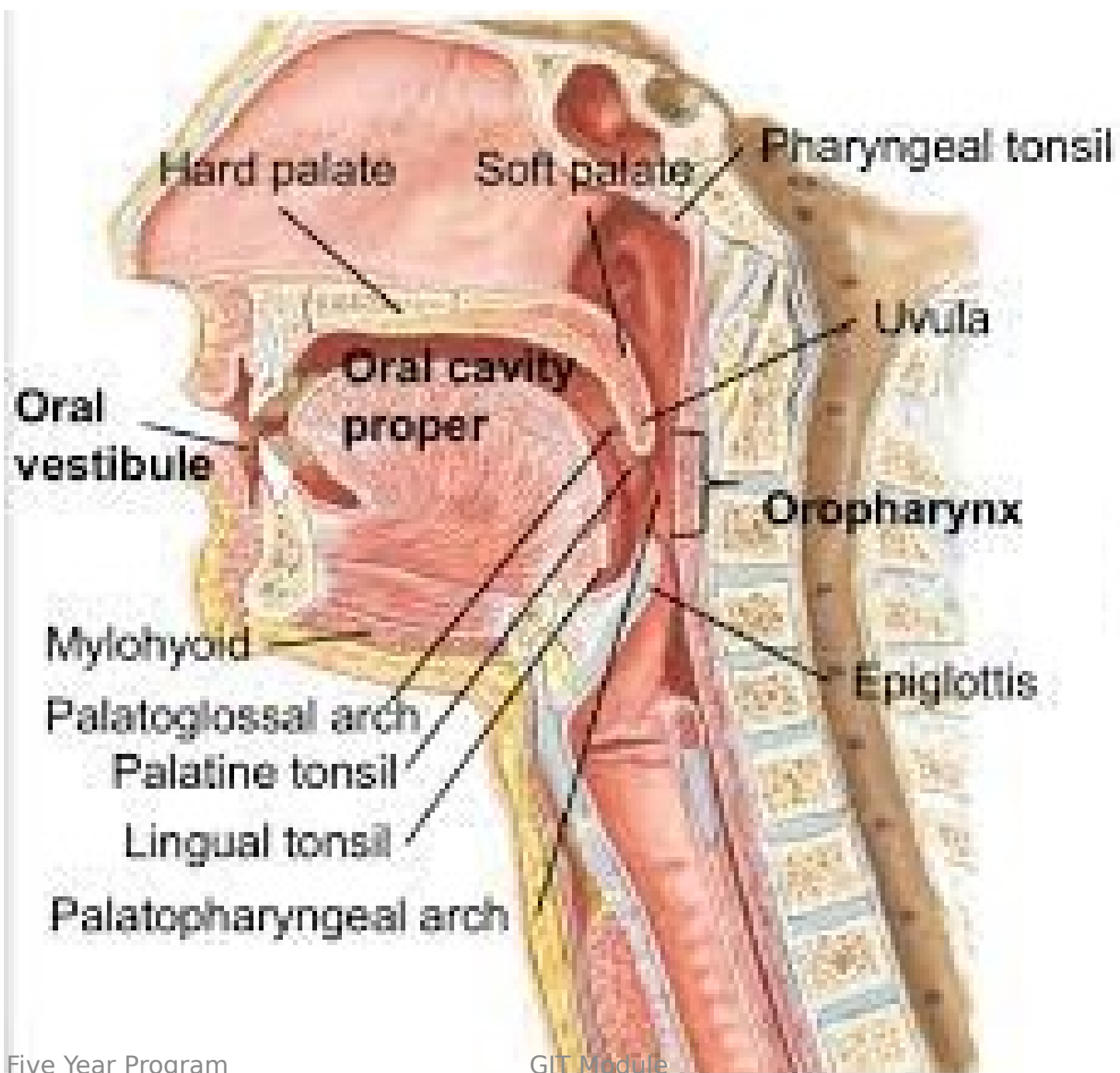


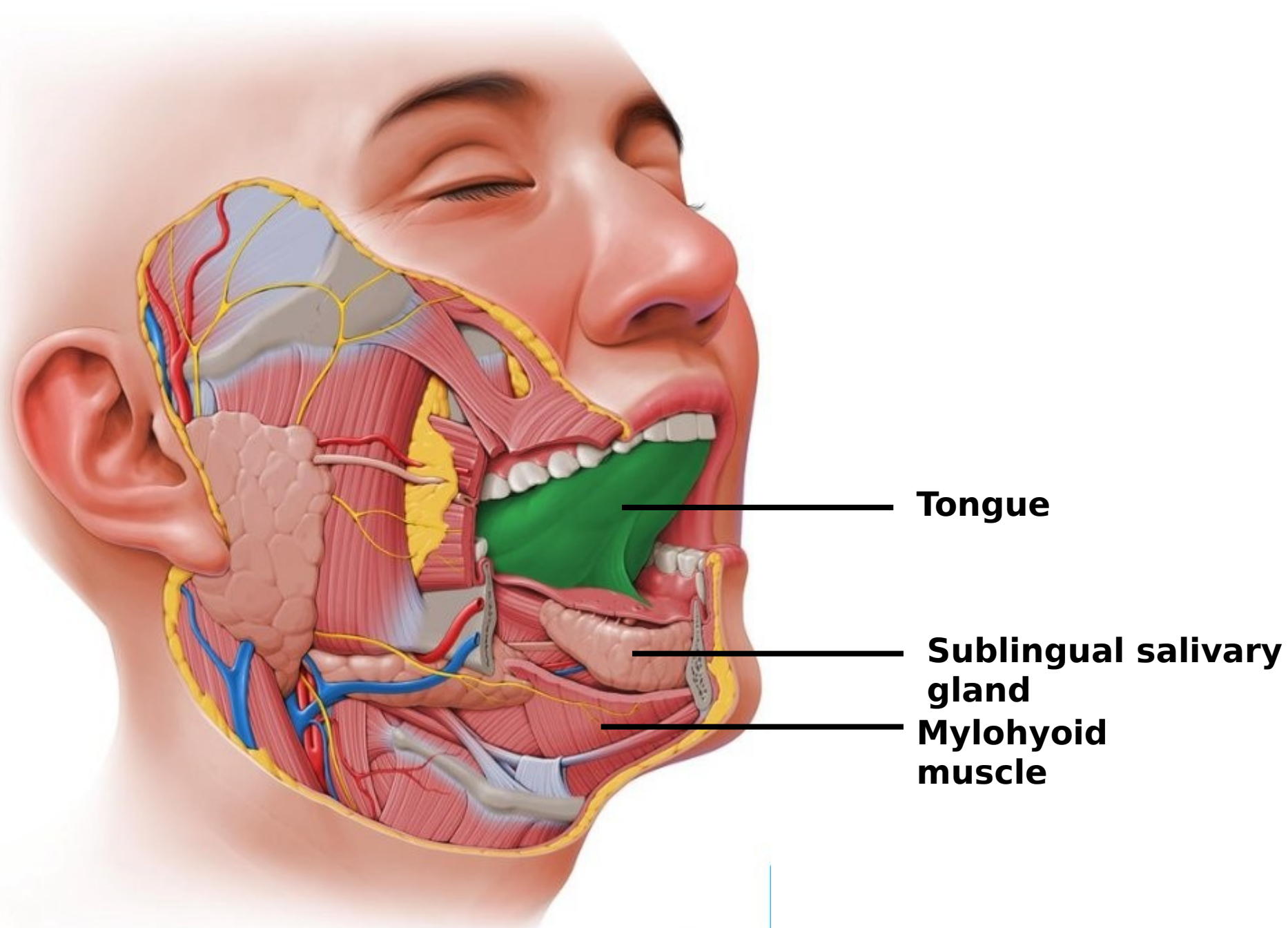


# Oral Cavity

- ❑ **Oral cavity proper:**
  - It is a space that lies **internal** to the teeth and gums.
  - It has **a roof** and **floor**.
  - It **ends** posteriorly at the **palatoglossal arches** where it communicates with the oropharynx.
  - The **roof** of the oral cavity is formed by **the palate** and the **floor** is formed by **the mylohyoid muscle**.

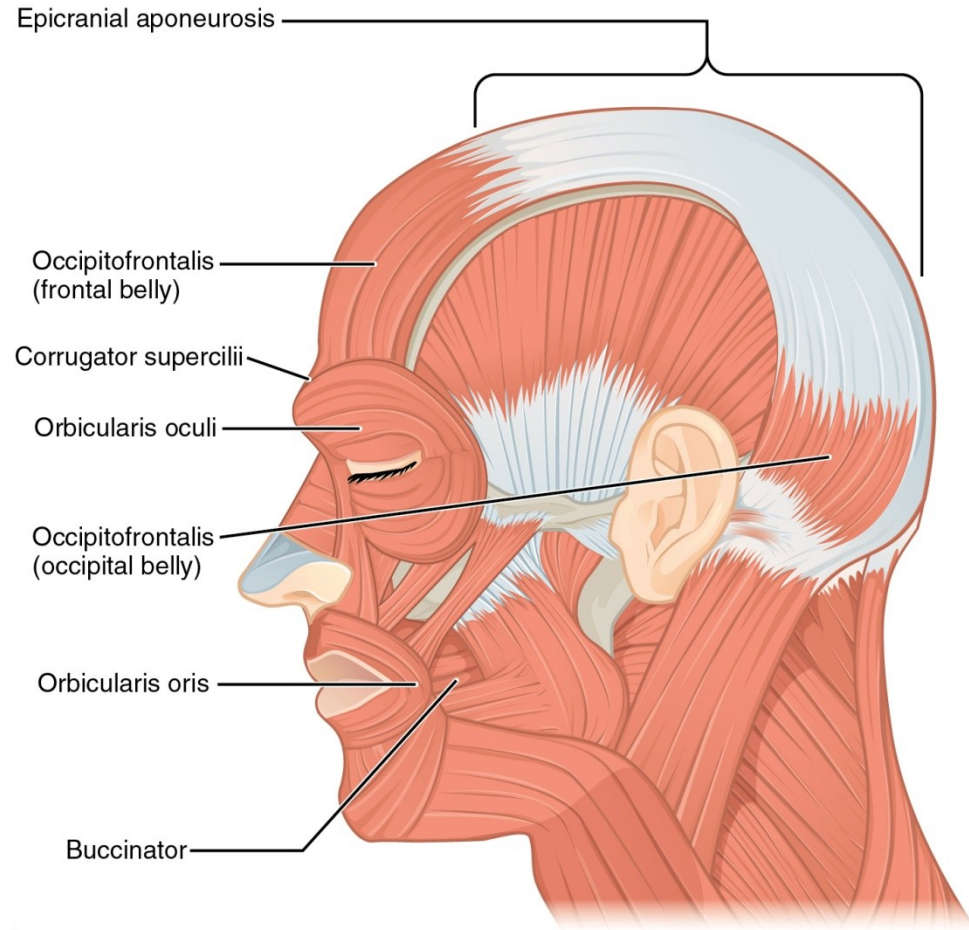






# Oral Cavity

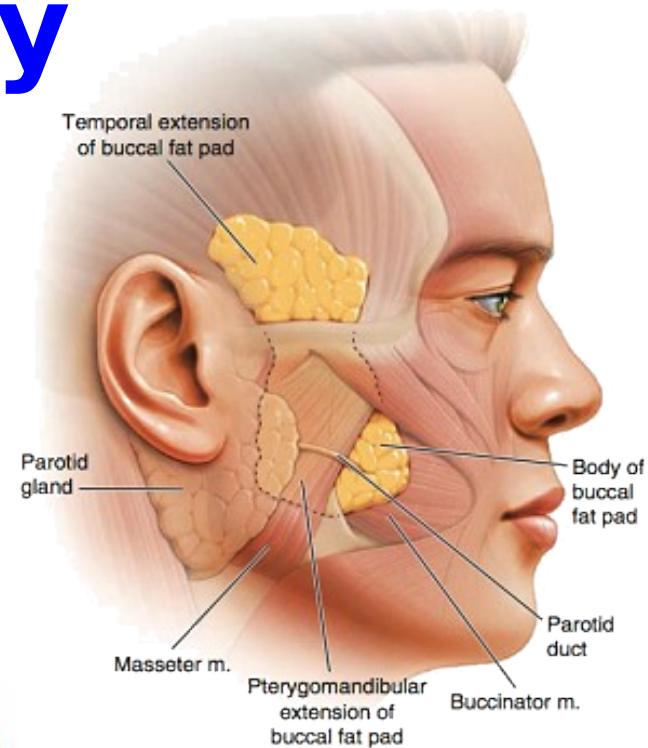
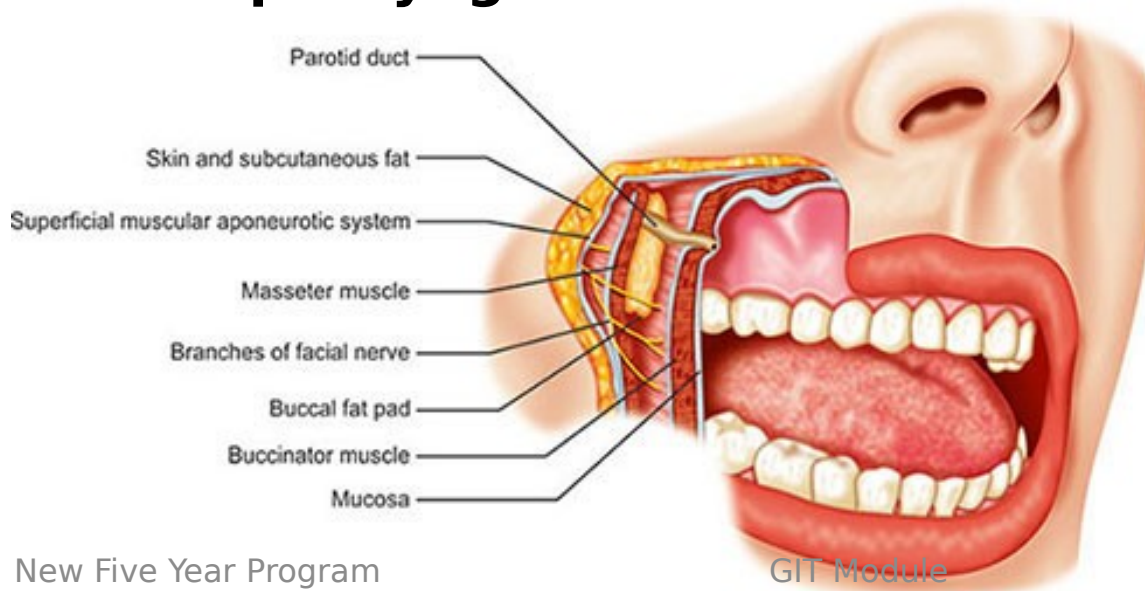
- **Lips:** They enclose the **orbicularis oris muscle** around the oral orifice.
- **Cheeks:** they are continuous with the lips at **the nasolabial groove**.





# Oral Cavity

- The muscle of the cheek is mainly the **buccinator**, which is covered **internally** by mucous membrane and **externally** by skin, buccal pad of fat and buccopharyngeal fascia.



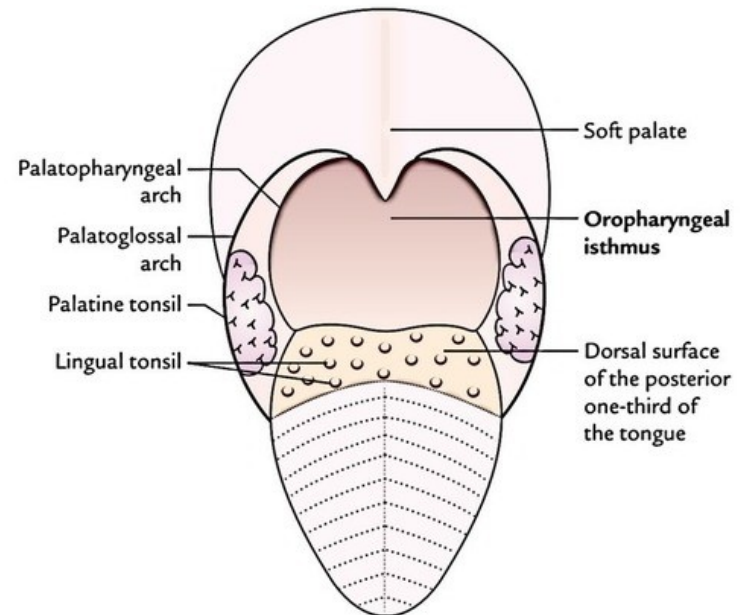
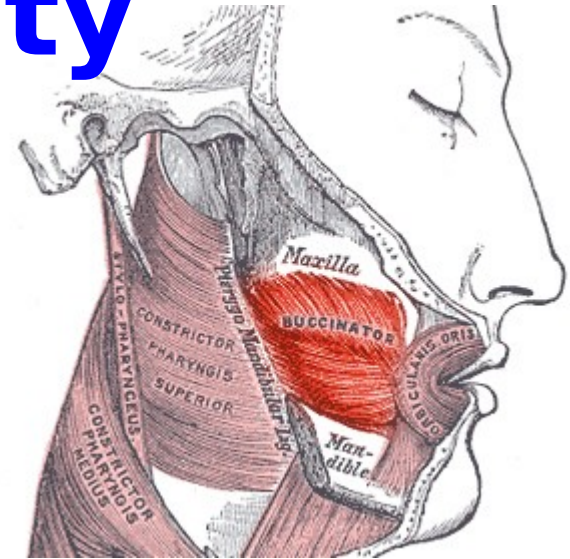
# Oral Cavity

**N.B.:**

▮The mouth opening (oral orifice or fissure) is **controlled** by the **orbicularis oris**.

▮The opening to the oral cavity proper is guarded by the teeth and is **controlled** by **muscles of mastication**.

▮The oro-pharyngeal isthmus may be opened or closed by muscles of the tongue and the soft palate.





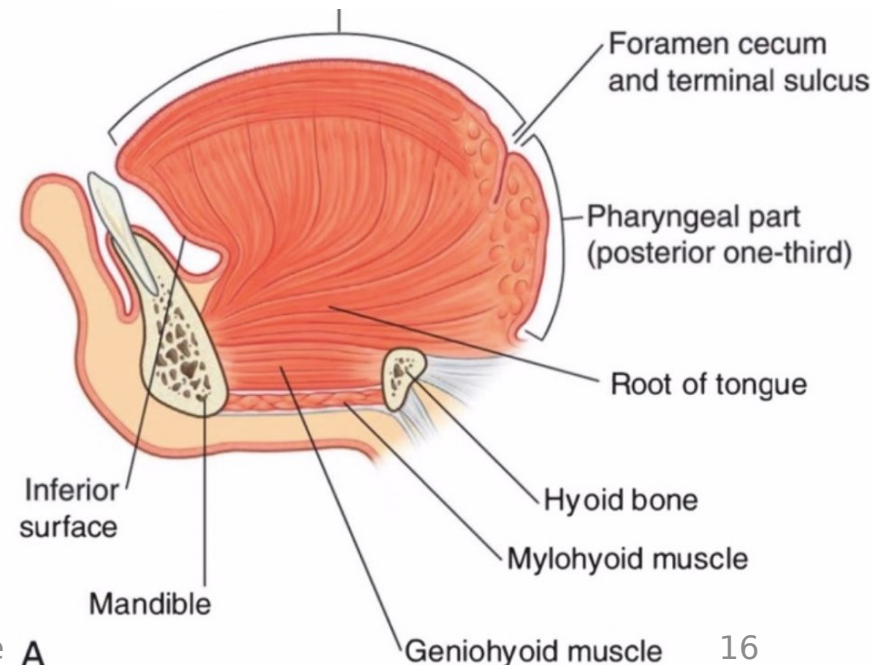
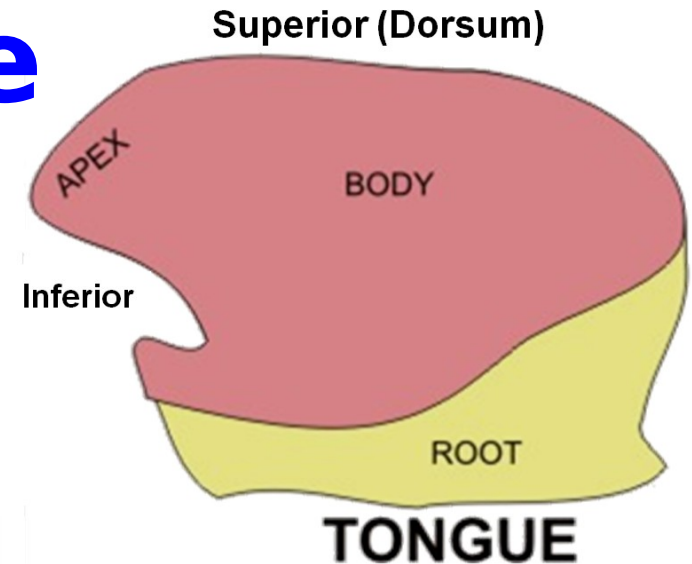
**Where does the parotid duct opens?**

- a. Floor of the mouth at the sublingual fold**
- b. Floor of the mouth at the sublingual papilla**
- c. Vestibule of the mouth opposite upper 2<sup>nd</sup> molar tooth**
- d. Vestibule of the mouth opposite lower 2<sup>nd</sup> molar tooth**
- e. Foramen cecum**

# Tongue

- The tongue is a **muscular organ** lying in the oral cavity, it is used in, speech, deglutition and taste.
- **Shape:** it has root, tip, dorsum and inferior surfaces.

**1. Root of the tongue:** represents its **posterior end, connected to mandible and hyoid**



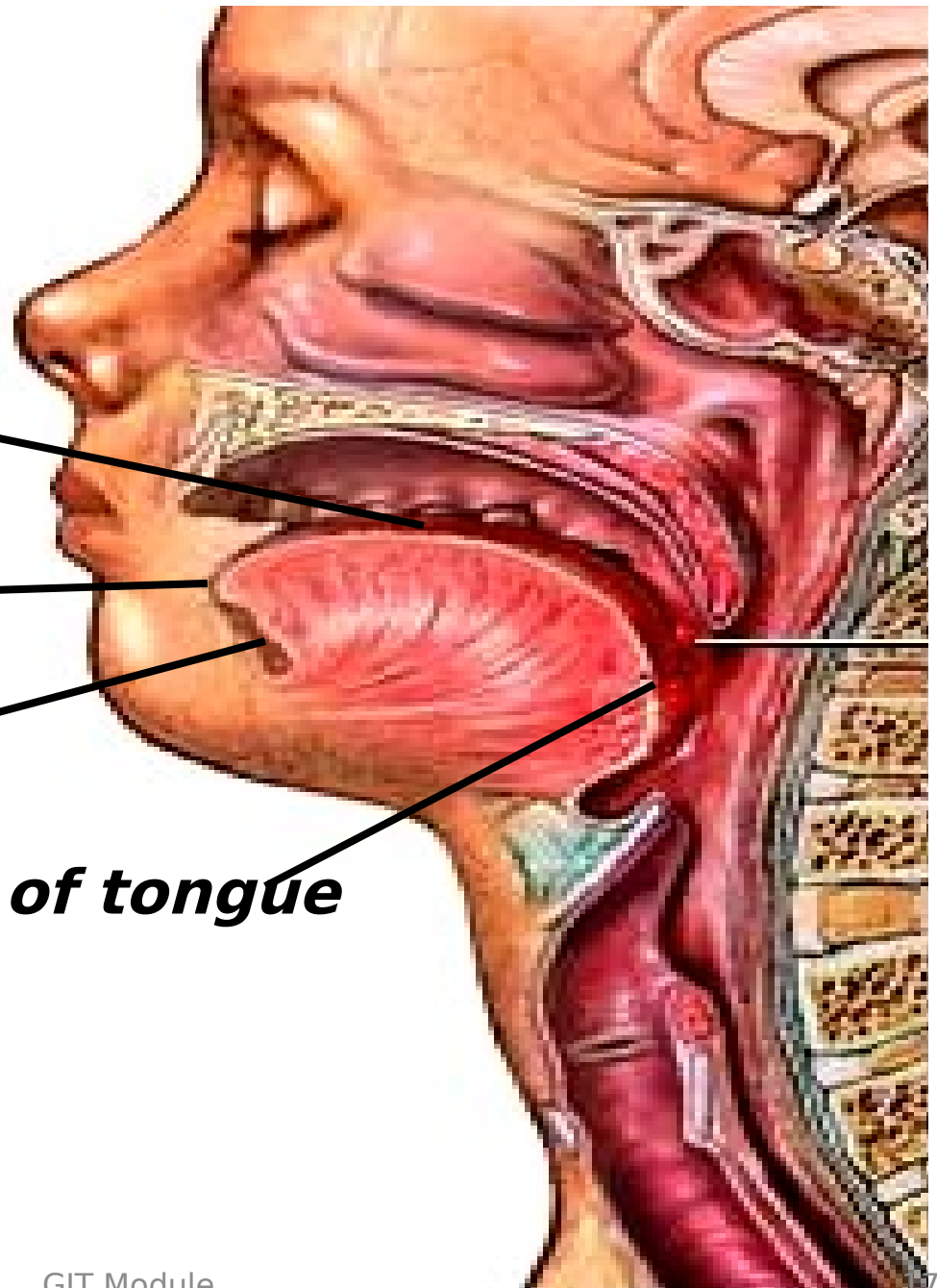


***Dorsum of  
tongue***

***Tip of  
tongue***

***Inferior surface  
of tongue***

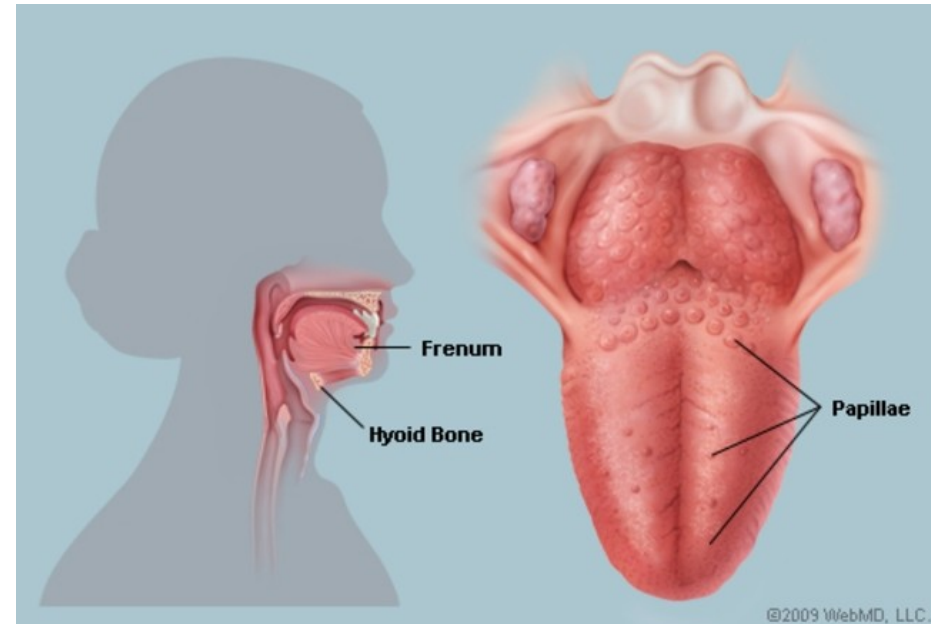
***Root of tongue***

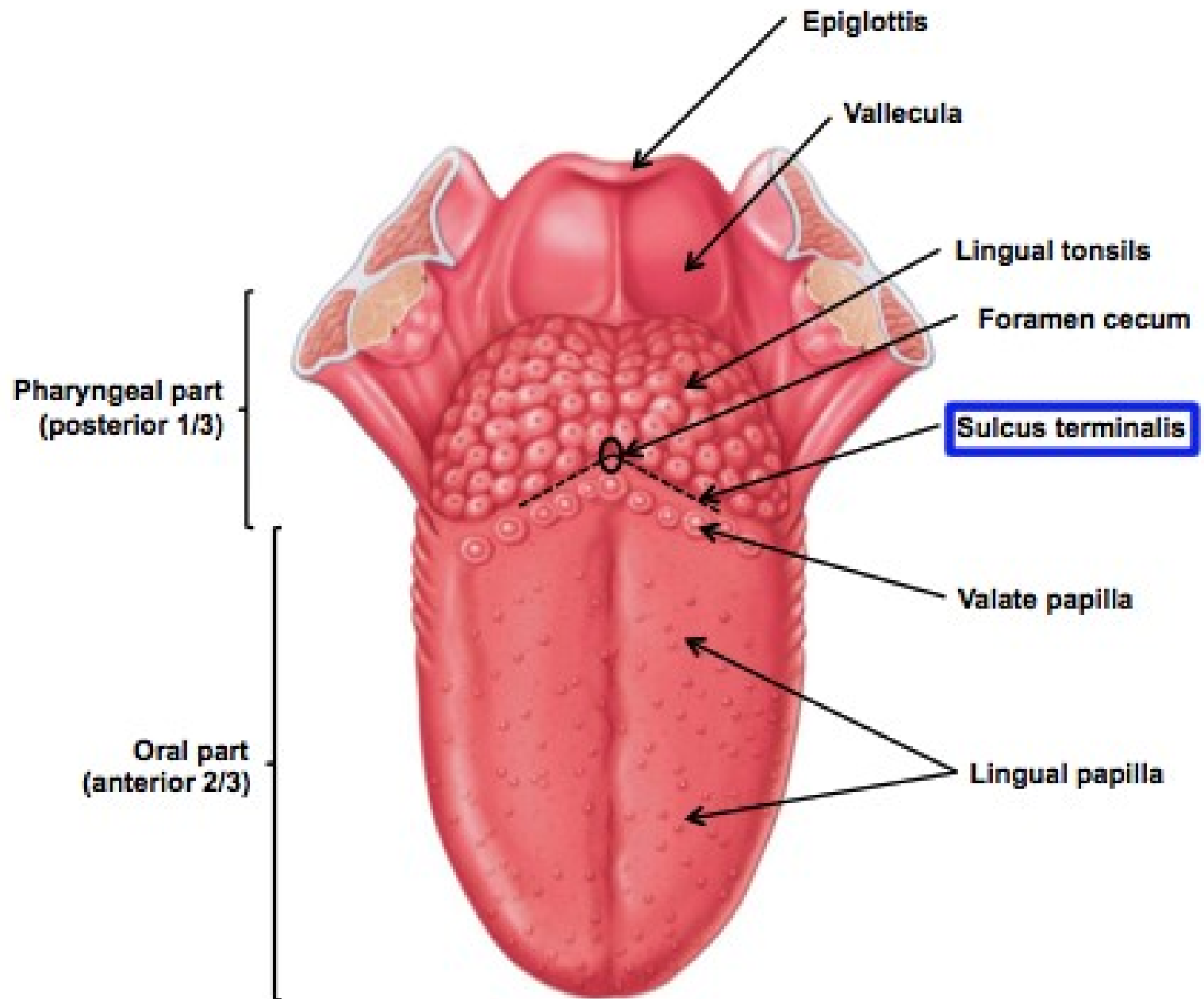


# Tongue

## 3. Dorsum of the tongue: is divided into:

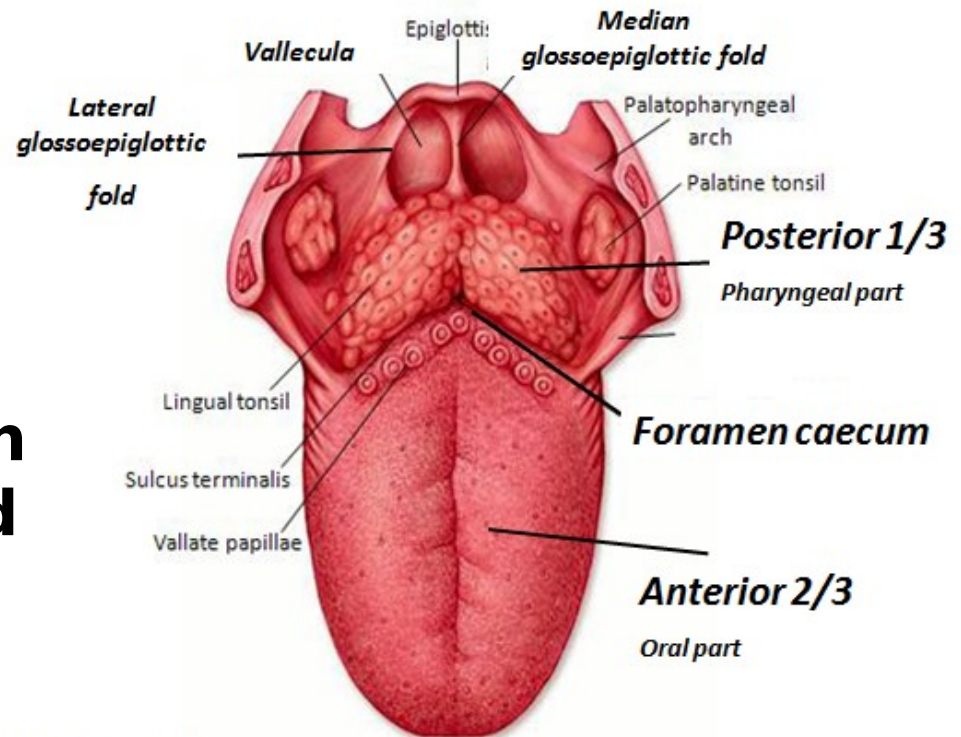
- **Anterior 2/3** (oral part)
- **Posterior 1/3** (pharyngeal part)
- Both parts are separated by **V shaped sulcus terminalis**.
- At the **apex** of the V is a pit (**foramen caecum**) which represents the upper end of thyroglossal duct.

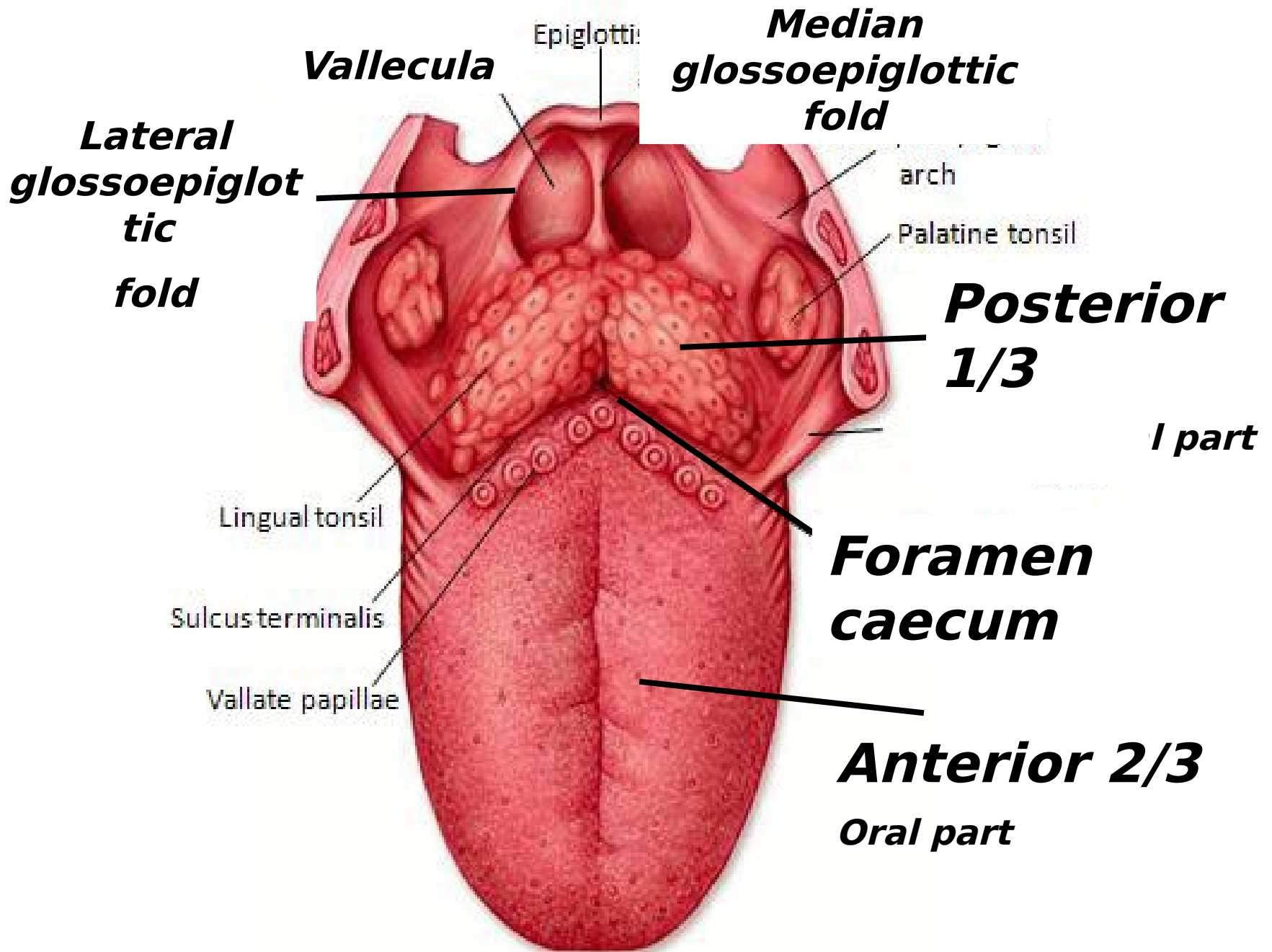




# Tongue

- **Between** tongue and epiglottis there is a **fold** of mucous membrane called **median glossoepiglottic fold**.
- **On each side** of which is a **depression** called **vallecula** bounded laterally by a fold called **lateral glossoepiglottic fold**.





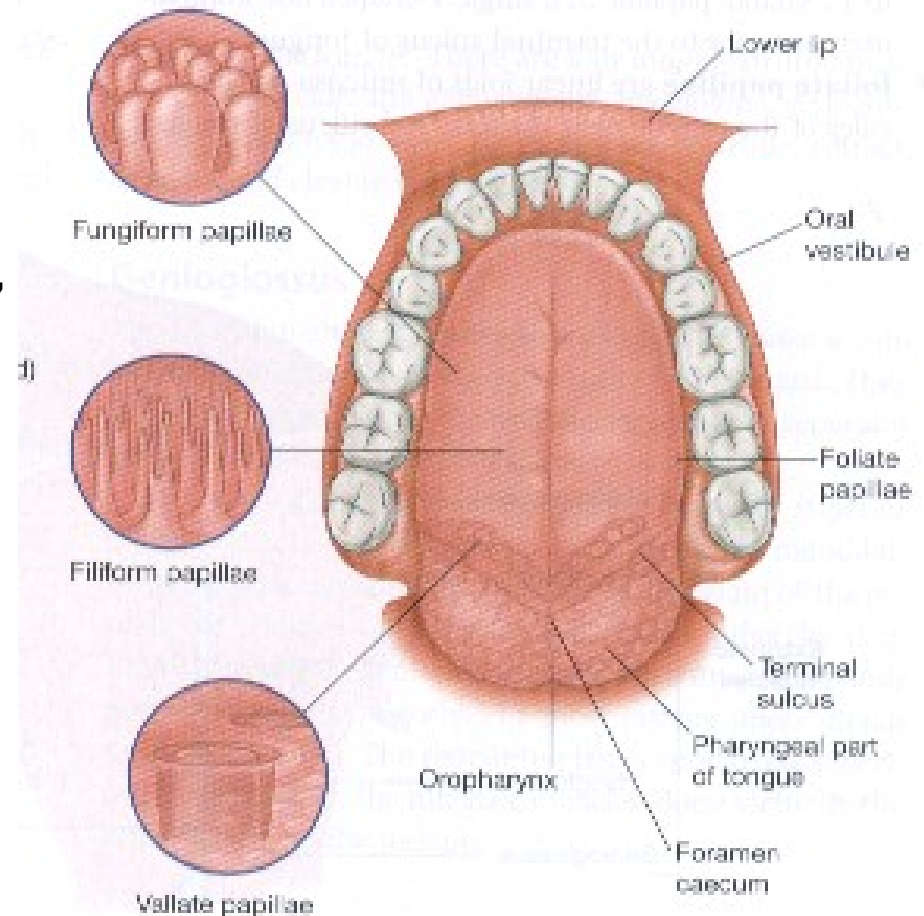
# Differences between Oral and Pharyngeal parts of the Tongue

Posterior 1/3	Anterior 2/3	
In oropharynx	In mouth cavity	Site
From 3 <sup>rd</sup> and 4 <sup>th</sup> pharyngeal arches	from 1 <sup>st</sup> pharyngeal arch	Origin
Has no papillae but its surface is nodular due to the underlying lingual tonsils	Thick, rough, due to the presence of papillae	Mucous membrane

# Tongue

## ▪ Papillae

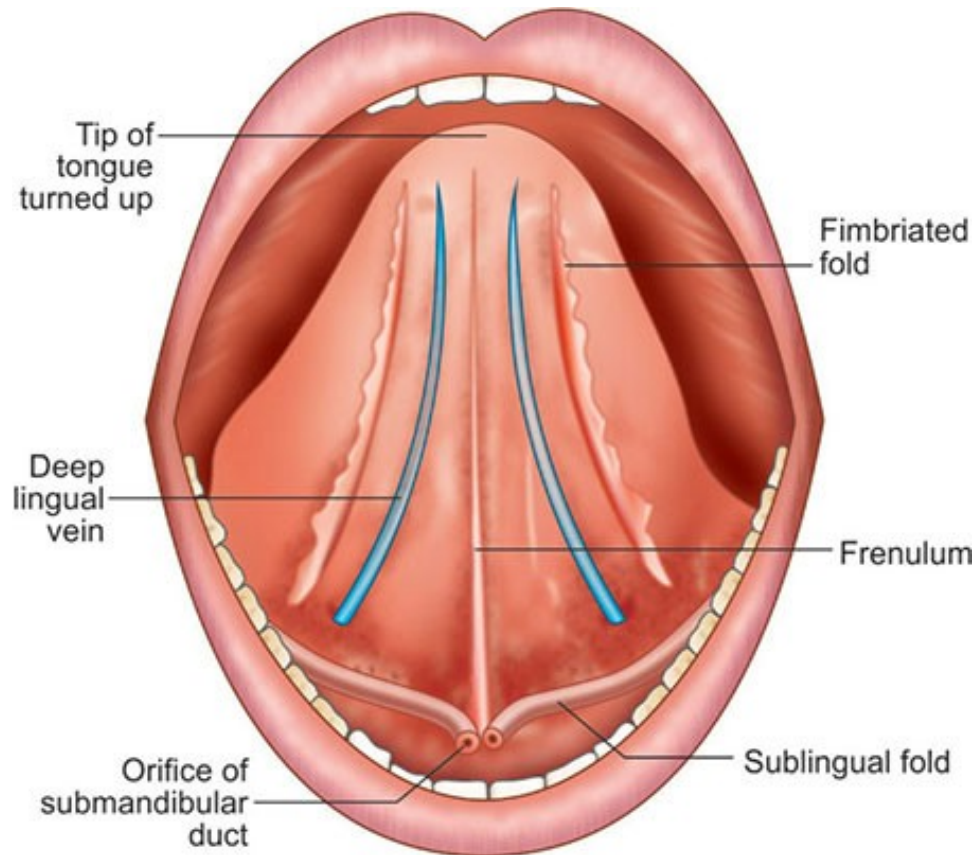
- **Vallate papillae:** large in size, (8-12) in number, found immediately in front of and parallel to sulcus terminalis.
- **Fungiform papillae:** numerous, concentrated at tip and margins.
  - These 2 types **contain taste buds** and carry taste sensation.
- **Filiform papillae:** numerous, minute and cover most of the dorsal surface. Their function is mechanical.
  - They **don't contain** taste buds.



# Tongue

## 4. Inferior surface of the tongue:

- It is related to floor of mouth and covered by mucosa.
- It shows the following features:
  - Median **lingual frenulum**
  - The **deep lingual vein** (branches of lingual artery and nerve are close to the vein but are not seen).
  - **Plica fimbriata**: A fold lateral to the vein.
  - In the mucosa of the floor of mouth, **sublingual folds** are present over the **sublingual glands**.
  - On both sides of the





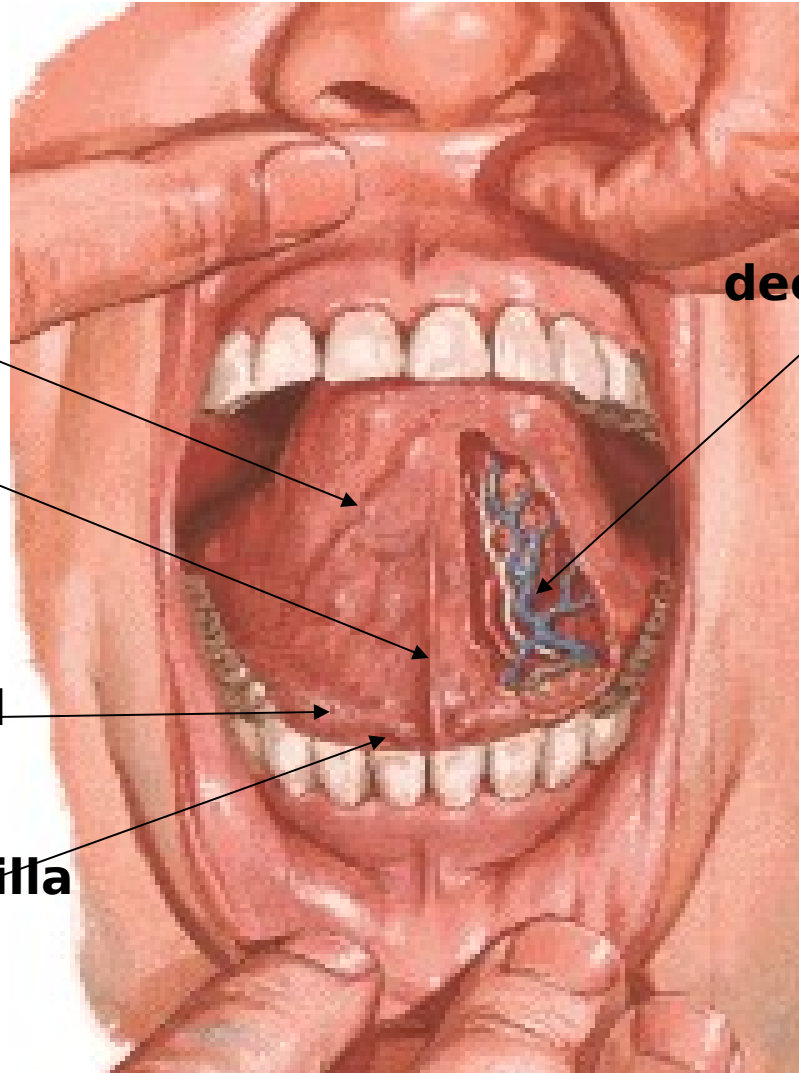
**Plica fimbriata**

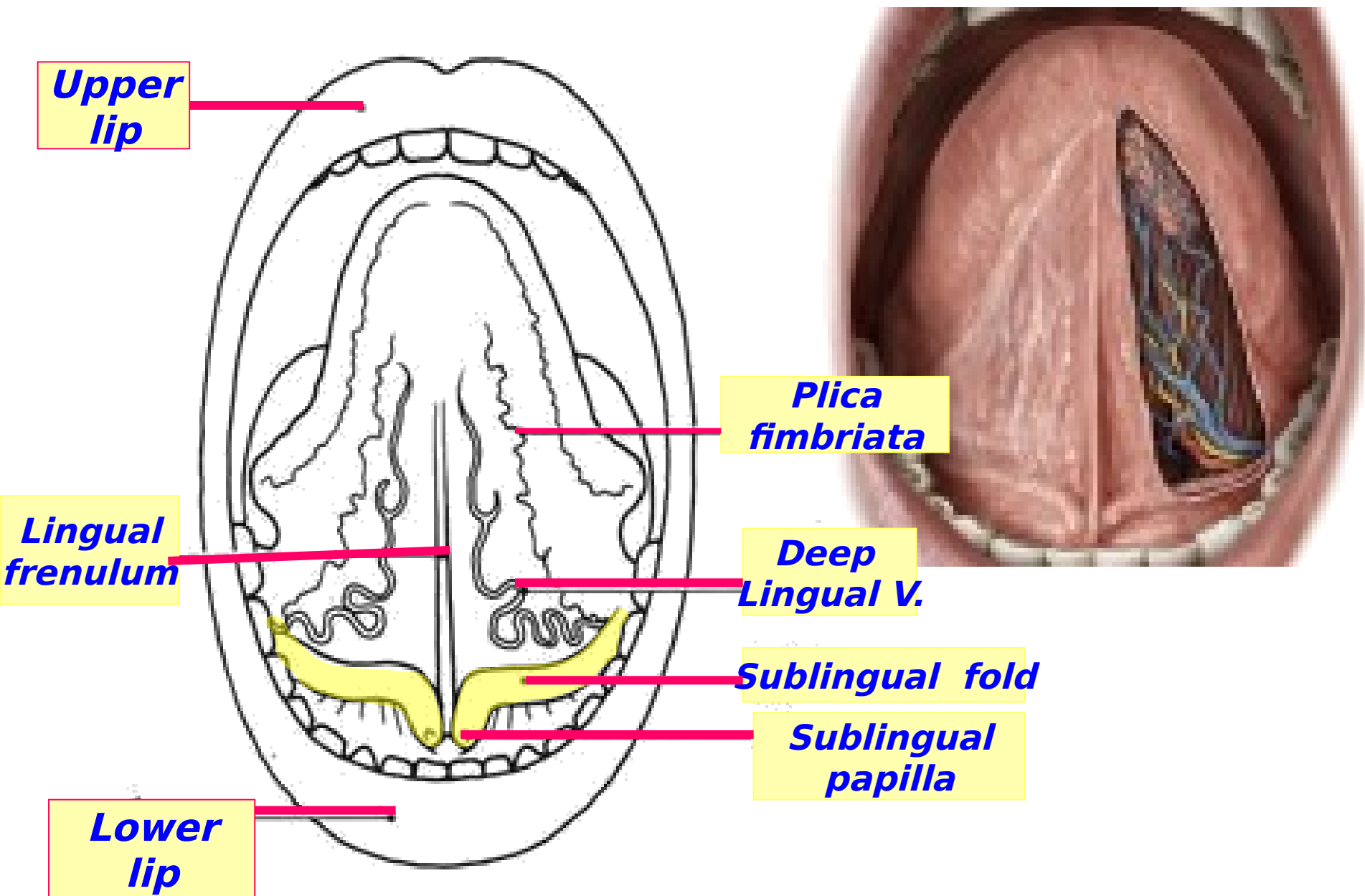
**Lingual frenulum**

**Sublingual fold**

**Sublingual papilla**

**deep lingual vein**







- **Mention 2 differences between oral and pharyngeal parts of the tongue.**
- **Describe 2 features on inferior surface of the tongue.**

# Musculature of the Tongue

## ❑ Musculature of the tongue:

It is formed of 4 intrinsic and 4 extrinsic muscles.

### ▪ The intrinsic muscles:

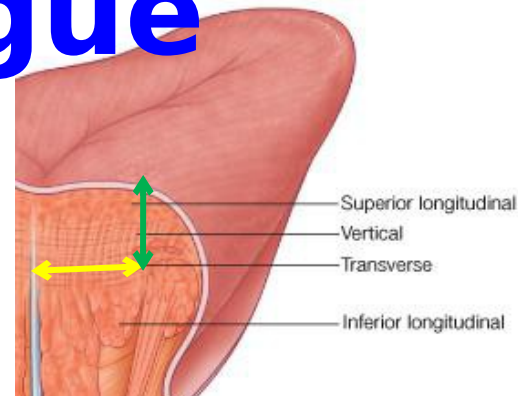
- They are **not** attached to bone.
- They **alter the shape** of the tongue.

1. **Superior longitudinal:** lies beneath the mucous membrane of dorsum of tongue.

2. **The inferior longitudinal:** narrow band near its inferior surface.

➤ **Longitudinal muscles shorten the tongue.**

3. **The transverse:** it makes

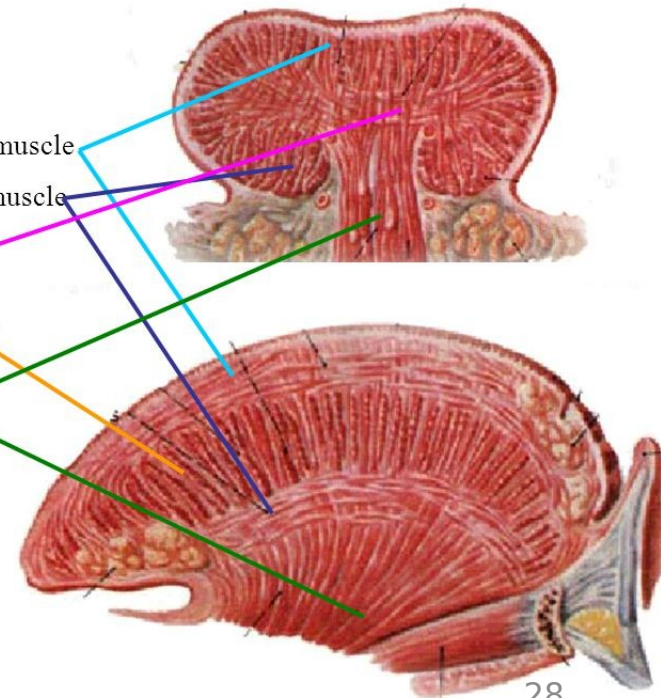


#### Intrinsic muscles

- superior longitudinal muscle
- inferior longitudinal muscle
- transverse muscle
- vertical muscle

#### Extrinsic muscles

- ❑ **genioglossus**



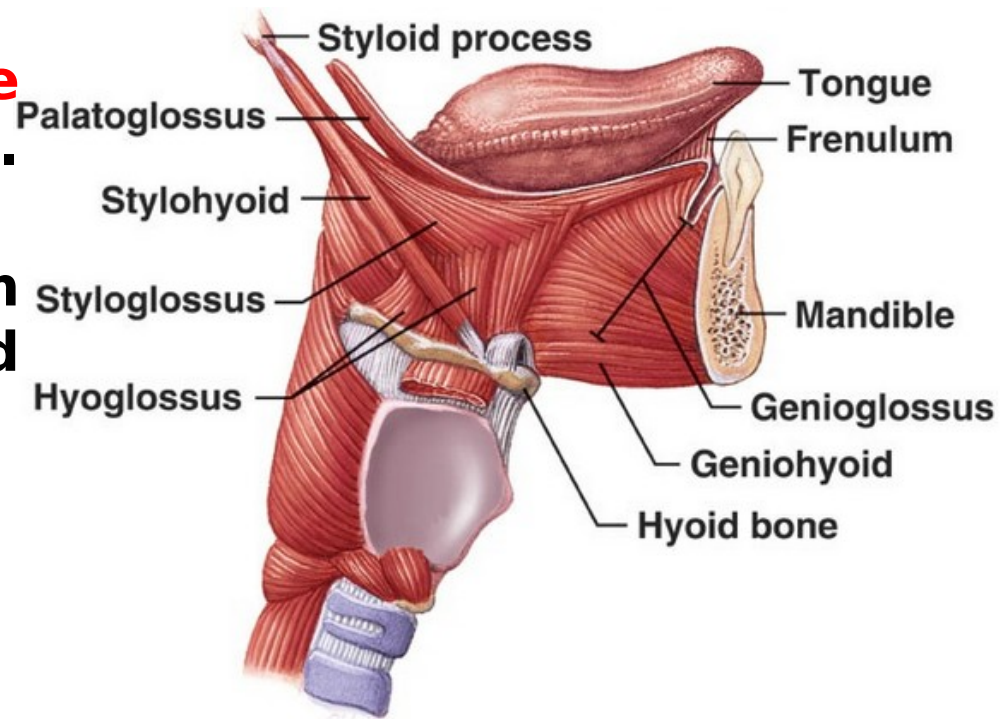
## LESSON SUMMARY



# Musculature of the Tongue

- **Extrinsic muscles:**
  - They are **attached** to bone.
  - They **change the position** of the tongue. (Move the tongue)
  - They **originate** from **remote structures** and insert into the tongue.

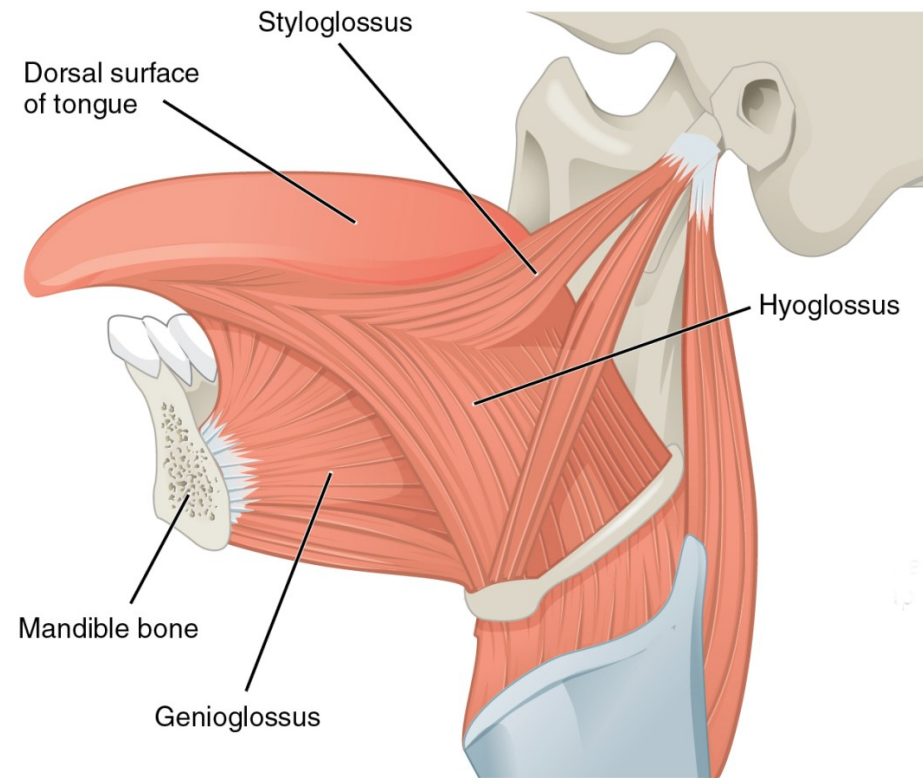
- **Genioglossus**
- **Hyoglossus**
- **Styloglossus**
- **Palatoglossus**



# Musculature of the Tongue

## □ Genioglossus

- A fan shaped muscle which forms the main bulk of the tongue.
- **Origin:** Upper genial tubercle (mental spine) of the mandible.
- **Insertion:** Whole length of the **dorsum** of the tongue from the tip to the hyoid bone.
- **Actions:**
  - A single muscle **pushes** the tongue to the **opposite side**.
  - The 2 muscles **protrude** the tongue.



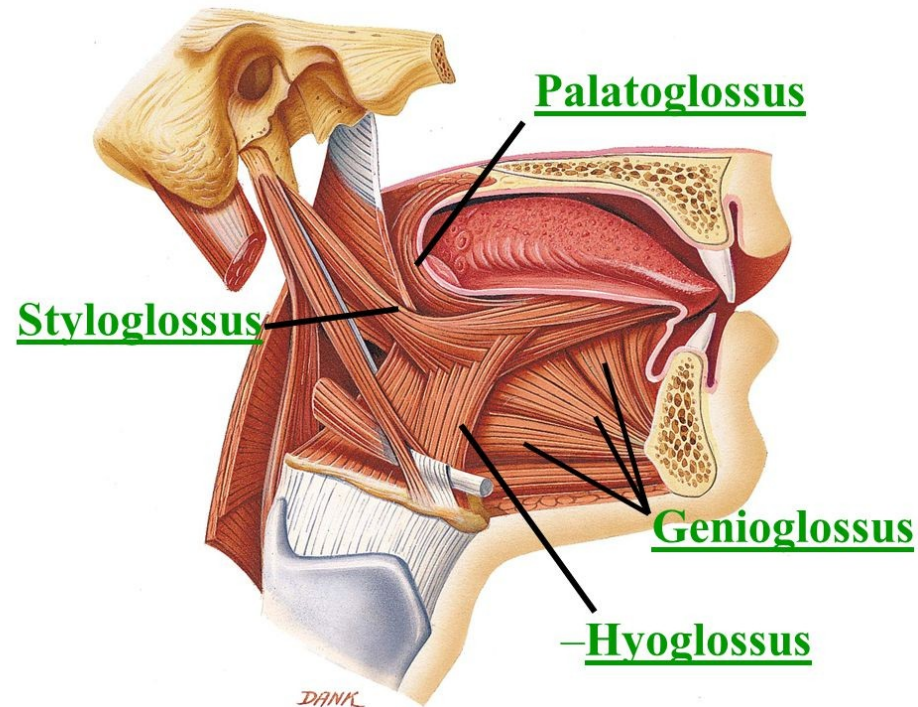
(a) Extrinsic tongue muscles



# Musculature of the Tongue

## ❑ Hyoglossus

- It is a quadrilateral muscle.
- **Origin:** Hyoid bone.
- **Insertion:** Its fibers run upward to insert into posterior  $\frac{1}{2}$  of the side of the tongue.
- **Actions:** Depresses the side of the tongue.





# Musculature of the Tongue

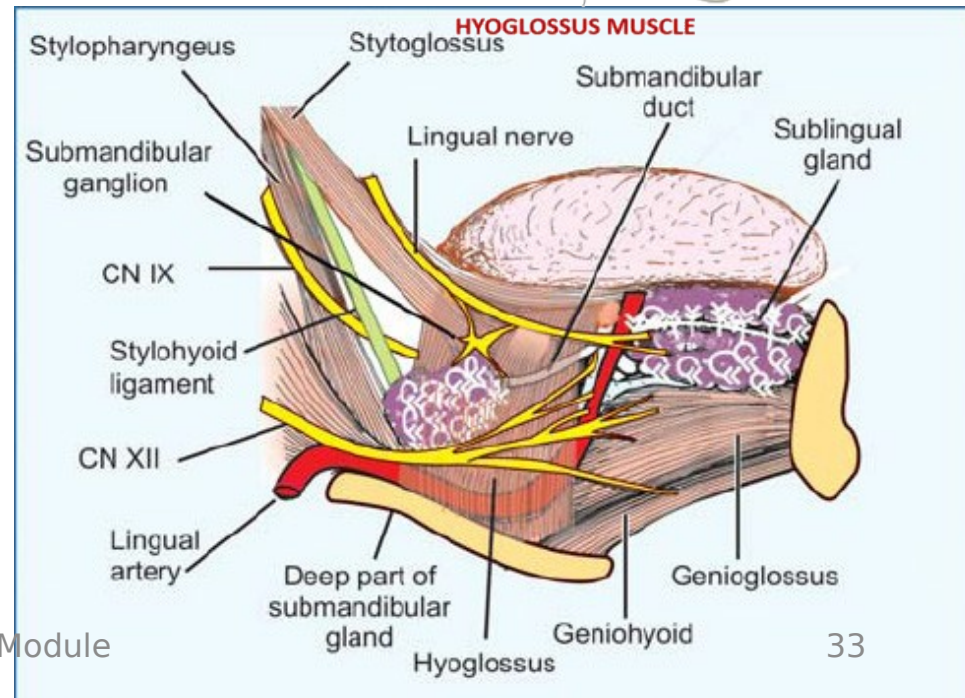
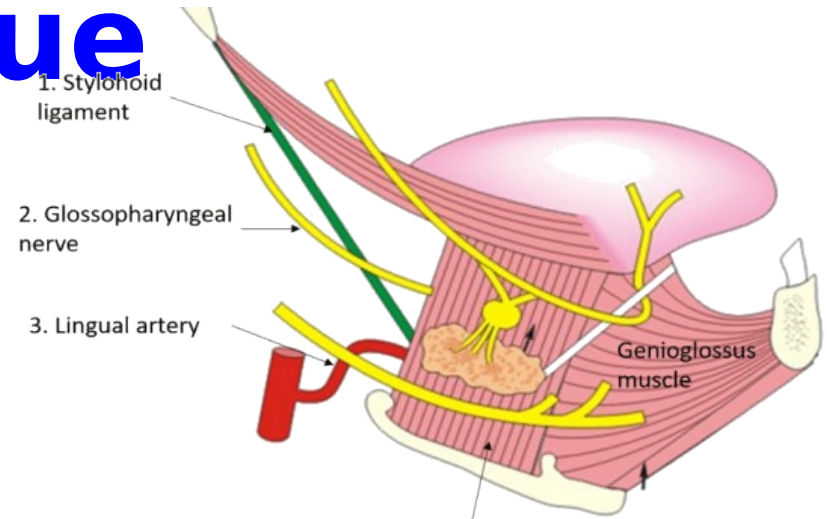
## ❑ Relations:

➤ **Superficial** ⇒ (N - G - N)

○ Lingual N., deep part of submandibular gland and hypoglossal N.

➤ **Deep** ⇒ (N - A)

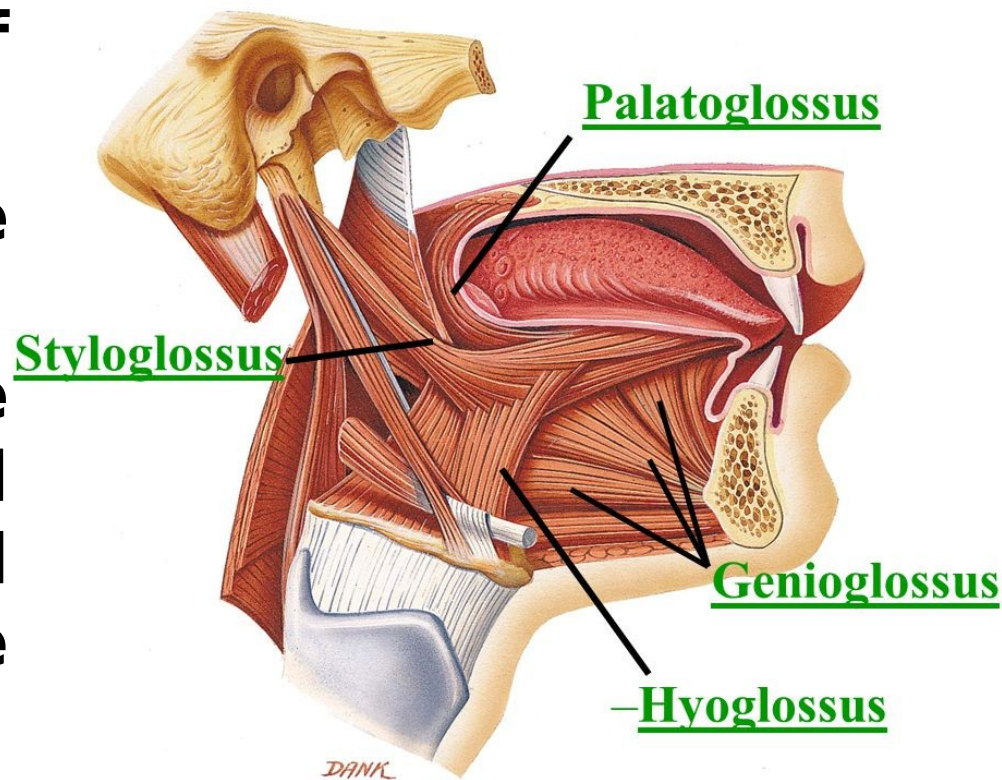
○ Glossopharyngeal N. and 2<sup>nd</sup> part of lingual A.]



# Musculature of the Tongue

## □ Styloglossus

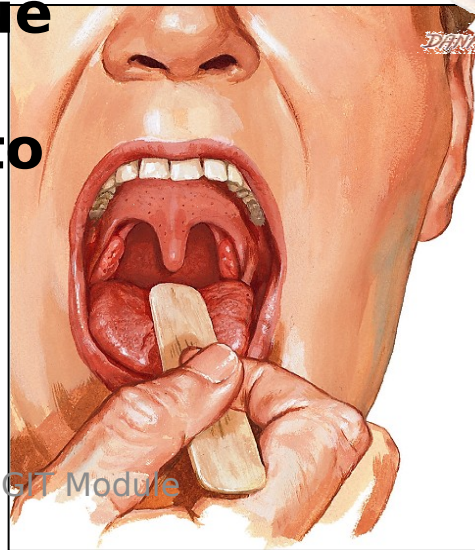
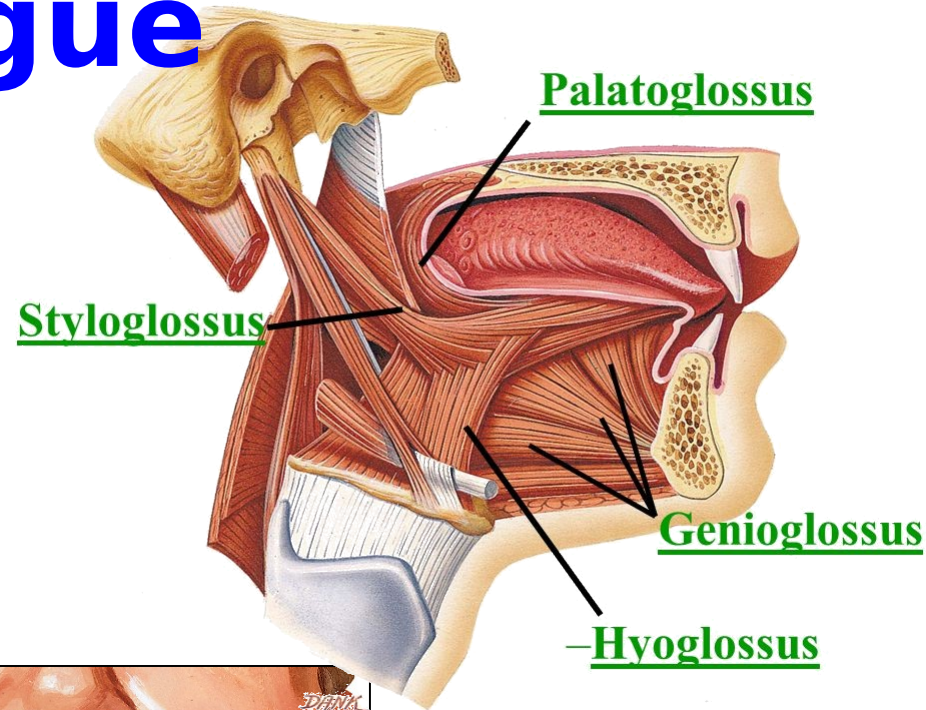
- **Origin:** Apex of styloid process.
- **Insertion:** into the side of the tongue.
- **Actions:** Pulls the tongue upward and backward (retraction of the tongue).



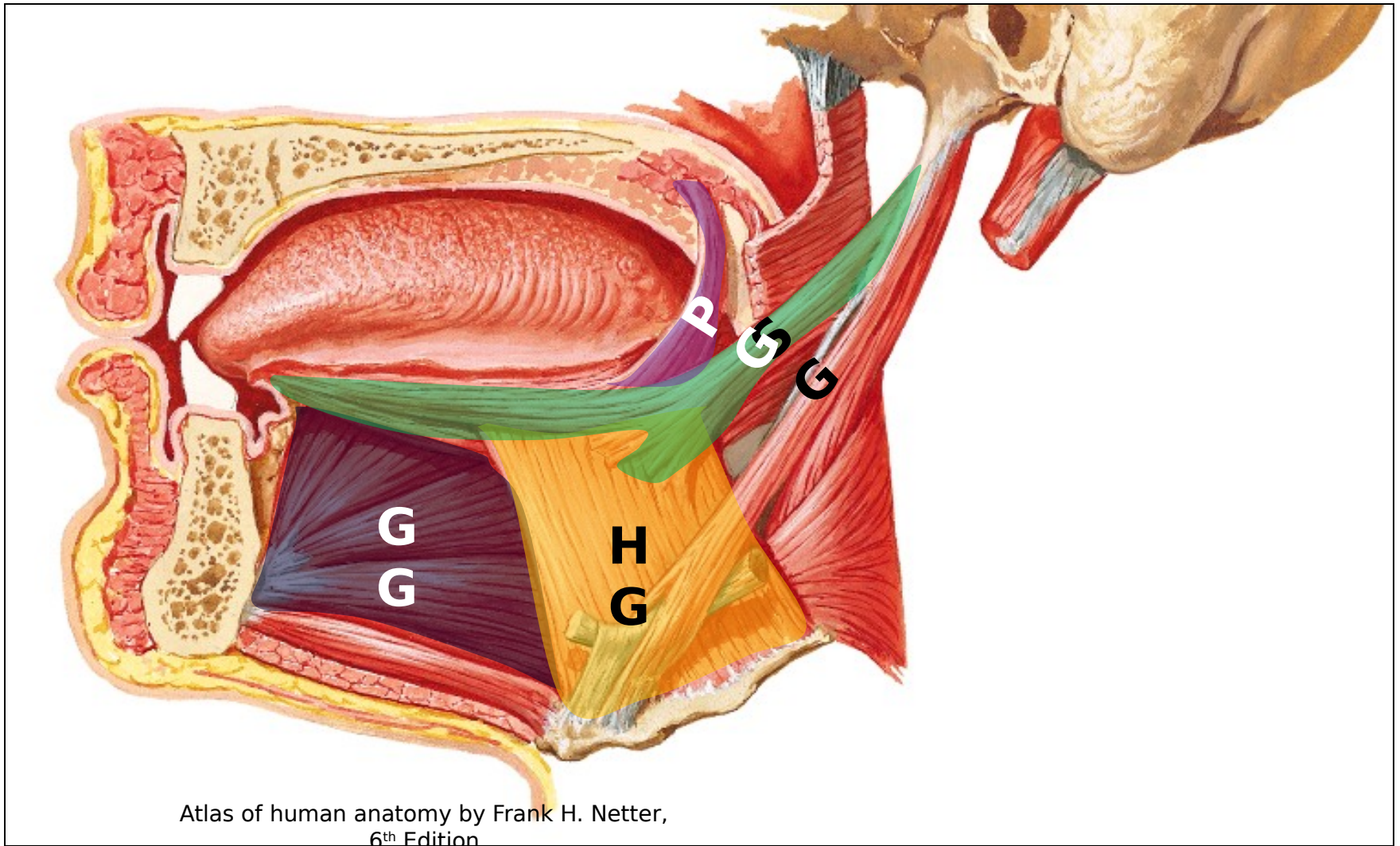
# Musculature of the Tongue

## ❑ Palatoglossus

- **Origin:** under surface of palatine aponeurosis.
- **Insertion:** side of tongue.
- **Action:**
  - Elevates root of tongue and approximates palatoglossal arches to **shut off** oral cavity from oropharynx.







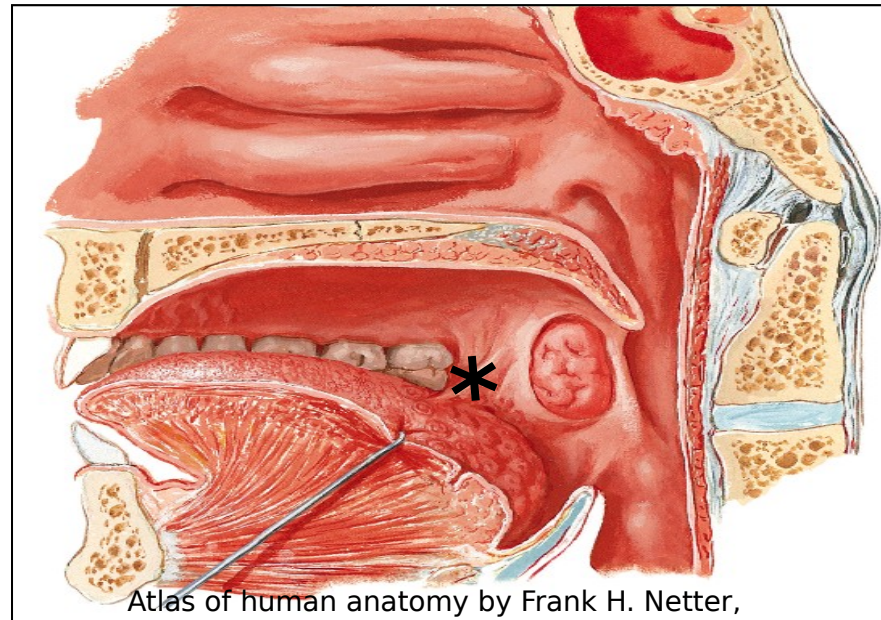
# Quiz

**Which one of the following muscles protrudes the tip of tongue toward the opposite side?**

- a. Hyoglossus**
- b. Genioglossus**
- c. Palatoglossus**
- d. Styloglossus**
- e. Superior longitudinal**

# Quiz

## Identify



Atlas of human anatomy by Frank H. Netter,  
6<sup>th</sup> Edition

# Nerve Supply of the Tongue

## ❑ Motor supply:

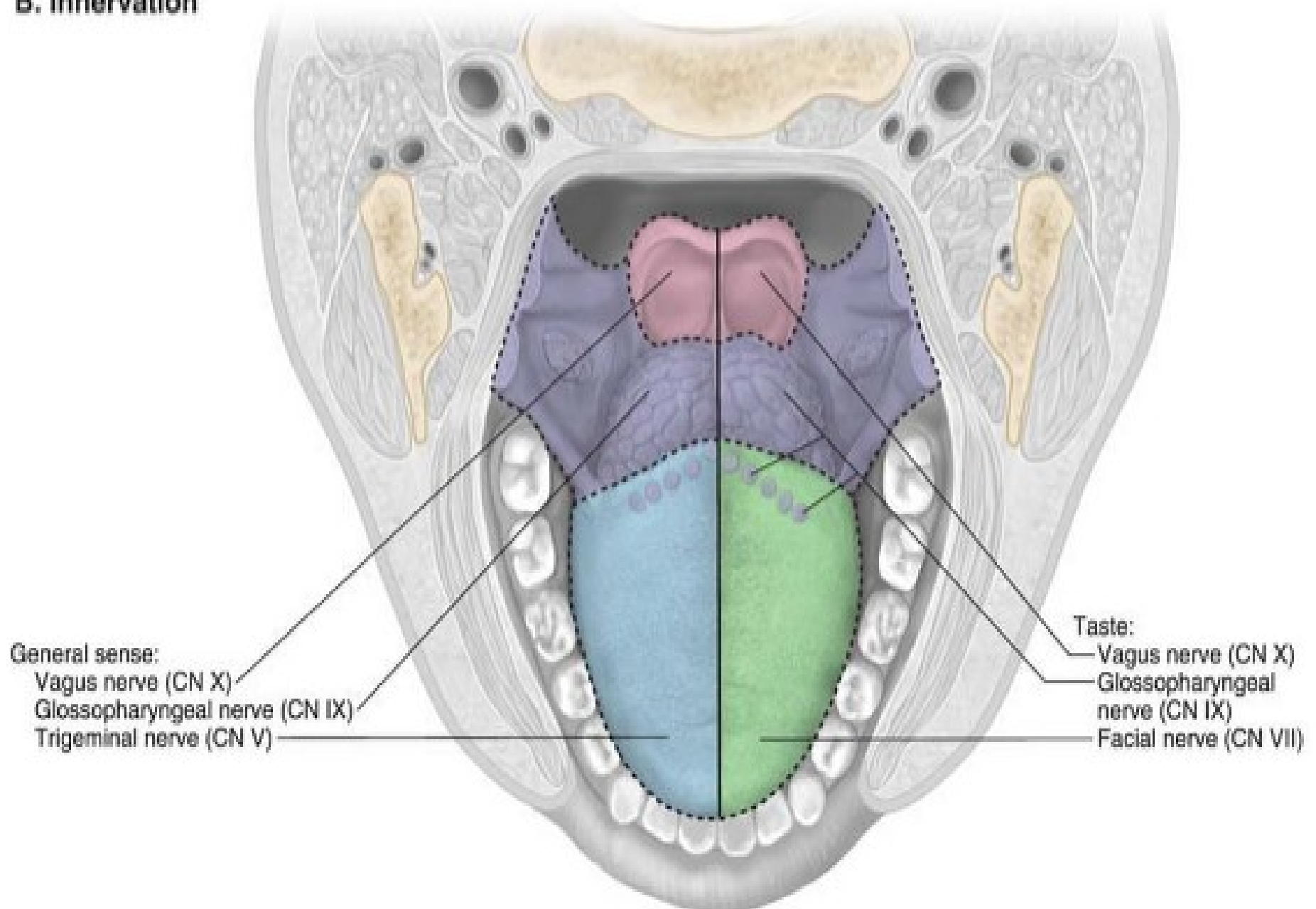
- All muscles of tongue are supplied by **hypoglossal nerve** **except** **palatoglossus**, which is supplied by **cranial accessory** joining **the vagus** through pharyngeal plexus.
- ❑ Applied anatomy:
  - Paralysis of the tongue is usually due to affection of the hypoglossal nerve.
  - The tongue deviates to the paralyzed side **(Pushed by the normal muscle)** accompanied with atrophy of the paralyzed side.

# Sensory Supply of the Tongue

<b>Special (taste) sensation</b>	<b>General sensation</b>	
<b>Chorda tympani branch of facial</b>	<b>Lingual nerve branch of mandibular</b>	<b>Anterior 2/3</b>
	<b>Glossopharyn geal nerve</b>	<b>Posterior 1/3 and vallate papillae</b>
	<b>Internal laryngeal nerve branch</b>	<b>Most Posterior part</b>



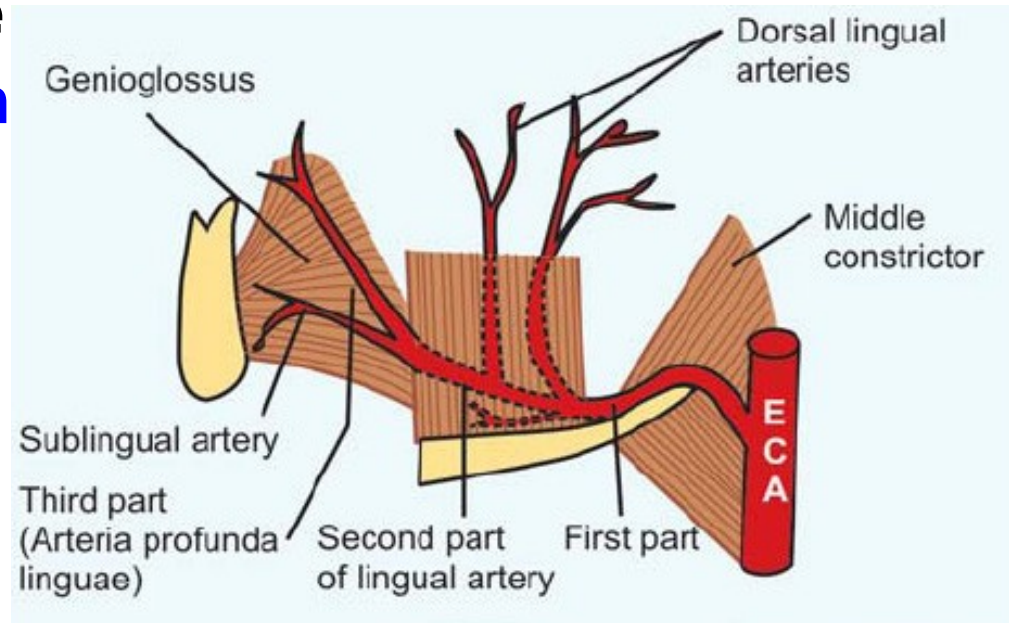
## B. Innervation



# Arterial Supply of the Tongue

## ❑ Arterial supply:

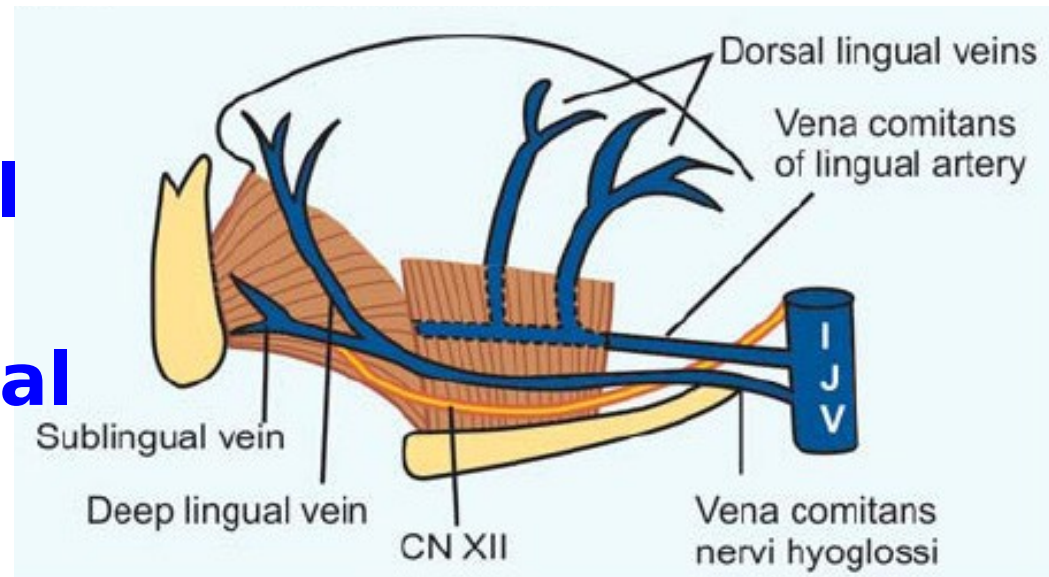
- **Lingual artery supplies the tongue**
- **Deep lingual branch** supplies anterior part of tongue.
- **Dorsal lingual branches;** supply posterior part of tongue.



# Venous Drainage of the Tongue

## □ Venous drainage:

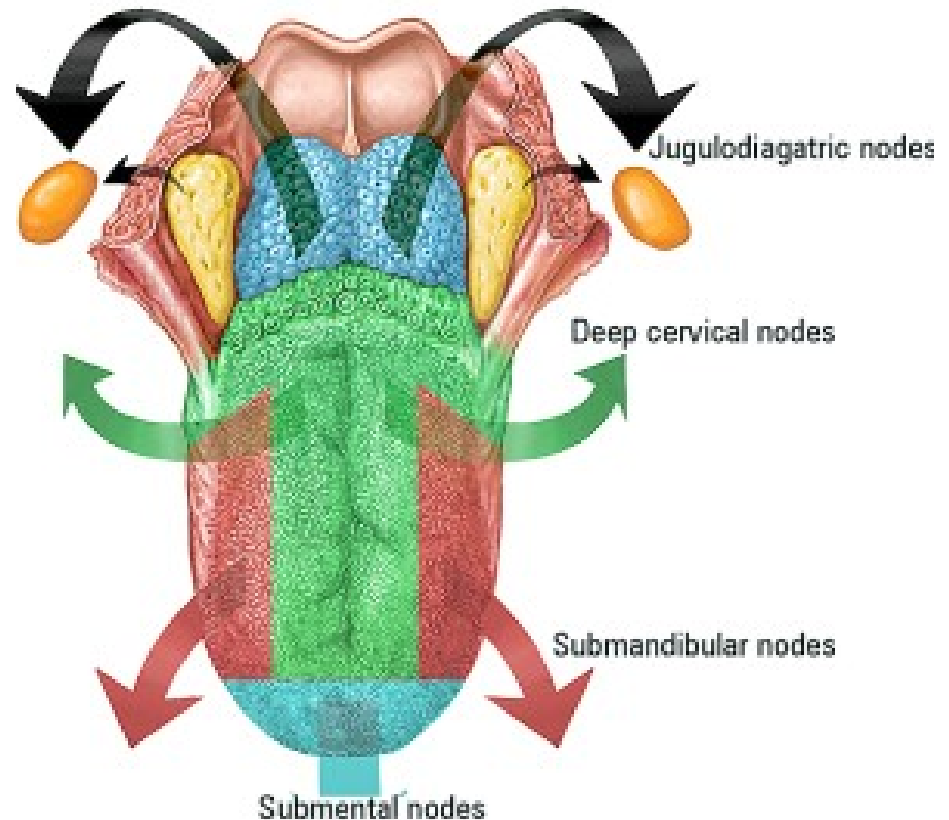
- by lingual vein, as follows:
  - The deep lingual vein
  - The dorsal lingual veins
- they form the lingual vein that ends in IJV.



# Lymphatic Drainage of the Tongue

## □ Lymphatic drainage:

- The tip drains **bilaterally** to submental L.N.
- The margins drain **unilaterally** to submandibular and upper deep cervical L.N.
- The body drains **bilaterally** to the same L.N. as the margins.
- Posterior 1/3: drains **bilaterally** into upper deep cervical (jugulo-digastric and Jugulo-omohyoid L.N.).



# Quiz

- **What is the sensory nerve supply of anterior 2/3 of the tongue?**
- **Describe the lymphatic drainage of posterior 1/3 of the tongue.**

# Lecture Summary



- **Oral cavity is divided into oral vestibule and oral cavity proper.**
- **It extends posteriorly to the palatoglossal arches.**
- **Tongue has a root, tip, dorsal and inferior surfaces.**
- **Dorsal surface is divided into anterior 2/3 (oral part) and posterior 1/3 (pharyngeal part).**
- **Dorsal surface has 3 types of lingual papillae and inferior surface has 5 features.**
- **The tongue has 4 intrinsic and 4 extrinsic muscles in each half; separated by a lingual septum. All are innervated by hypoglossal nerve (12<sup>th</sup> CN) except palatoglossus muscle by cranial accessory nerve (11<sup>th</sup> CN).**
- **Remember innervation (both motor and sensory) and blood supply of the tongue. *Very important***



# Suggested Textbooks

- 1. Gray's anatomy for students: With student consult online access, 3<sup>rd</sup> Edition.**
- 2. Snell, clinical anatomy by regions, 9<sup>th</sup> Edition.**
- 3. Atlas of human anatomy by Frank H. Netter, 6<sup>th</sup> Edition.**
- 4. Web sites:**
  - <https://studentconsult.inkling.com>**
  - <https://www.clinicalkey.com/student>**

# **Thank You**